# Bacterial Vaginosis in Antenatal Patients in Abakaliki, Nigeria.

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## Abstract

***Objective:*** To determine the prevalence of Bacterial Vaginosis and its associated adverse pregnancy outcomes amongst pregnant women attending antenatal clinic in Ebonyi State University Teaching Hospital, Abakaliki.
***Methods:*** A prospective study involving 200 out of 375 consecutive antenatal asymptomatic women who satisfied the inclusion criteria was carried out. The AMSTEL criteria were used in making the diagnosis of Bacterial Vaginosis. The women were subsequently followed up to delivery. Antenatal, pre-partum, intra-partum and post-partum complications were recorded.
***Results:*** The prevalence rate of Bacterial Vaginosis in this population was found to be 10.5%. There were also higher percentage prevalence of pre-term rupture of membranes, pre-term labour, and pre-term delivery as well as low birth weight, vacuum delivery and post-partum haemorrhage among the women with Bacterial Vaginosis than those without, even though the difference could not be tested for statistical significance due to smallness of numbers as a result of loss to follow-up.
***Conclusion:*** There is a 10.5% prevalence of Bacterial Vaginosis in this population. There also seem to be a higher association of adverse pregnancy outcomes in women with Bacterial Vaginosis compared with the others. There is a need for a larger study to confirm these findings and assess the effect of treatment on pregnancy outcomes.

**Key Words:** Bacterial Vaginosis; Antenatal; Pregnancy Outcome [Trop J Obstet Gynaecol, 2006, 23:100-104]

## Introduction

Bacterial Vaginosis (BV) is a condition associated with an alteration of the normal vaginal flora rather than an infection due to any specific microorganism.[1] It is characterized by reduced concentration of lactobacillus; and increased concentration of gram negative and anaerobic bacteria, particularly Gardnerella vaginalis, Mobilincus, Bacteroides, Prevotella, and Mycoplasma species.[1]

The 'AMSTEL criteria' (used in this study) is one of the methods used for the diagnosis of Bacterial Vaginosis. They include: 1) the presence of a grey homogenous vaginal secretion; 2) an elevated pH above 4.5; 3) a "fishy" odour on addition of 10% potassium hydroxide solution to the vaginal fluid (positive amine test); and 4) the presence of clue cells on the saline wet mount of the vaginal fluid. By the AMSTEL criteria, the co-existence of any three out of these four conditions confirms the diagnosis of BV. However, there are other more sophisticated techniques for the diagnosis of BV such as the use of the polymerase chain reaction (PCR) technology. They are mostly unavailable in developing countries, and where they are available, their high cost prohibits their being used for routine clinical work.

The occurrence of BV is global. In the industrialized countries outside of USA, prevalence rates are between 5-21% among presumably asymptomatic women attending antenatal care.[2] There is limited data on BV in Nigeria. In Benin City, a rate of 14.2% using the Nugent score method was found [3]. Some other studies have documented the prevalence of Gardnerella Vaginalis infections. For example, a study from Eastern Nigeria found a prevalence of 17% among pregnant women[4], while another study among non-pregnant women from Western Nigeria found a prevalence of 9.8%.[5]

Previously, this condition was regarded as harmless. However, recent literature links it to complications such as pre-term rupture of membranes, pre-term labour and pre-term delivery; chorioamnionitis; and post partum endometritis.[6]

This study therefore aims at assessing the prevalence of BV amongst pregnant women attending antenatal care in Ebonyi State University Teaching Hospital, Abakaliki, a tertiary health institution in eastern Nigeria. It also aims at assessing the association of BV with adverse pregnancy outcomes.

## Materials and Methods

This study, conducted in September 2003 at Ebonyi State University Teaching Hospital, Abakaliki, was a prospective exploratory study designed to assess the magnitude of, and any associated complications of BV in our centre. The hospital is a 300-bedded tertiary

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centre. It is located in the GRA part of Abakaliki metropolis, the capital of Ebonyi State, and serves as a referral centre for the state and adjoining states in the Eastern region of Nigeria. The department of Obstetrics and Gynaecology where this study was conducted has 8 consultants and 24 resident doctors.

*Sampling and Sampling Technique:*
As an exploratory study, a purposive sample of two hundred out of the 375 consecutive women who attended the antenatal booking clinic of the hospital in September 2003, and satisfied the inclusion criteria, participated in the study. These criteria include those who did not have vaginal bleeding.

- Those who did not have vaginal discharge.
- Those whose pregnancies were within the first and second trimesters.
- Those who were certain of their gestational age.

Every participant was required to sign an informed consent form after explaining to them the purpose of the study and the fact that they were free to withdraw their consent at any point in the course of the study with out any adverse consequences for their treatment.

*Measurement of Vaginal Fluid pH and Collection of Vaginal Secretion:*
The patients were examined in the dorsal position. Using a sterile Cusco's speculum, access into the posterior fornix was obtained. A pH paper mounted on a "mosquito" artery forceps was gently introduced into the posterior fornix, and was wetted with the vaginal secretions. The pH of the vaginal secretion was immediately read using a pH meter and recorded in the proforma designed for the study.

Next, vaginal secretion was collected using a sterile swab stick. The swab stick was then transferred to the laboratory where the other tests for the diagnosis of bacterial vaginosis according to the AMSTEL criteria were conducted. These include:
Assessing the character of the vaginal fluid

- The Amine test
- Checking for the presence of Clue cells.

The results of these tests were also recorded in the Proforma. Each participant was followed up till delivery. All adverse pregnancy and delivery outcomes were recorded.

*Data Analysis:*
Data was entered into the data editor and analyzed using SPSS version 11.0 soft ware package. Analysis was performed using simple percentages and frequency tables. The association between age, parity and BV; and between BV and adverse pregnancy and delivery outcomes were tested for statistical significance using the Chi-square statistic. Significance level was set at P= 0.05 level.

*Ethical Clearance:*
Ethical clearance for this study was obtained from the Hospital's research ethics committee.

## Results

The age range was from 16 years to 40 years with a mean of 24.7 years and a standard deviation of ± 6.5 years. The age class distribution shows that 7 ( 3.5%) were in the age class 16-19 years, 180 women (90%) were in the 20-34 year age class; while 13 (6.5%) were in the 35-40 year age class. (Table 1)

Parity ranged from zero to eight. The mean parity was 2.4. However, majority of the participants (89 or 44.5%) were nulliparous, 62 (31%) were multiparous while 49 (24.5%) were grandmultiparous.

As would be expected, age significantly influenced the parity of the participants. Thus, 6 of the 7 women (85.7%) =19 years were nulliparous, 82 out of the 180 women (44.4%) in the 20-34 year age class were nulliparous while only one out of the 13 women (7.7%) in the = 35 years age class were nulliparous. Thus, a much higher proportion of the older women were of higher parity than the younger women. The difference in these proportions is highly statistically significant ($\chi^2 = 12.405$; df = 4; P = 0.015).

Using the AMSTEL criteria, twenty (21) women were diagnosed as having bacterial vaginosis. This gives a prevalence rate of 10.5% for the study population. Age did not significantly influence the occurrence of bacterial vaginosis in the study population. Thus, one out of the 7 women who were aged 16-19 years (14.3%) had BV; 19 out of the 180 (10.6%) who were aged 20-34 years had BV; and one out of the 13 women (7.7%) who were aged 35-40 years had BV. The difference in these proportions is not statistically significant ($\chi^2 = 0.216$; P = 0.897). See Table 2.

**Table 1:**
**Age and Parity Distribution of the Women:**

| | PARITY | | | |
|---|---|---|---|---|
| | **Para 0 (Nullips)** | **Para 1-4 (Multips)** | **Para 5-8 (Grandmultips)** | **Total** |
| AGE:≤19 yrs | 6 | 0 | 1 | 7 |
| 20-34 yrs | 82 | 55 | 43 | 180 |
| ≥ 35 yrs | 1 | 7 | 5 | 13 |
| TOTAL | 89 | 62 | 49 | 200 |

$\chi^2 = 12.405$; df = 4; P = 0.015

**Table 2 A & B:**
**Relationship Between Age, Parity and Occurrence of Bacterial Vaginosis:**

| A: | Bacterial Vaginosis Positive | Negative | Total |
|---|---|---|---|
| Age: ≤ 19 yrs | 1 | 6 | 7 |
| 20-34 yrs | 19 | 161 | 180 |
| ≥ 35 yrs | 1 | 12 | 13 |
| TOTAL | 21 | 179 | 200 |
| $\chi^2 = 0.216$; | df = 2; | p = 0.897. | |

| B. | Bacterial Vaginosis Positive | Negative | Total |
|---|---|---|---|
| Parity: Zero | 9 | 80 | 89 |
| 1-4 | 7 | 55 | 62 |
| 5-8 | 5 | 44 | 49 |
| TOTAL | 21 | 179 | 200 |
| | $\chi^2 = 0.60$; | df= 2; | P = 0.970 |

**Table 3:**
**Association of Bacterial Vaginosis and Pregnancy Complications:**

| | Bacterial Vaginosis Positive (N=16) | Negative (N=73) |
|---|---|---|
| Complications: | | |
| Malaria | 1 (16.7%) | 1 (1.4%) |
| Epistaxis | 1 (16.7%) | 0 (0%) |
| Mumps | 0 (0%) | 1 (1.4%) |
| Polyhydramnios | 0 (0%) | 1 (1.4%) |
| Pregnancy induced hypertension | 0 (0%) | 4 (5.5%) |

**Table 4:**
**Association Between Bacterial Vaginosis and Intra/Post-Partum Complications:**

| | Bacterial Vaginosis Positive (N=6) | Negative (N=73) |
|---|---|---|
| **COMPLICATIONS:** | | |
| Spontaneous rupture of membrane at term | 2 (33.3%) | 37 (50.6%) |
| Pre-term rupture of membrane | 1 (16.7%) | 3 (4.1%) |
| Pre-term labour | 1 (16.7%) | 3 (4.1%) |
| Pre-term delivery | 1 (16.7%) | 3 (4.1%) |
| Low birth weight | 1 (16.7%) | 0 (0%) |
| Vacuum delivery | 1 (16.7%) | 10 (13.7%) |
| Caesarean section | 0 (0%) | 6 (8.2%) |
| Post-partum haemorrhage | 1 (16.7%) | 6 (8.2%) |
| Birth asphyxia | 0 (0%) | 15 (20.5%) |
| Macerated Still birth | 0 (0%) | 1 (1.4%) |

Similarly, parity did not significantly influence the occurrence of bacterial vaginosis in the study population. Thus, 9 out of the 89 nulliparous women (10.1%) had BV, 7 out of the 62 multiparous women (11.3%) had BV while 5 out of the 49 grand multiparous women (10.2%) had BV. The difference in these proportions is not statistically significant ($X^2$ = 0.60; P = 0.970). Parity therefore had no influence on the occurrence of BV in the population studied. See Table 2.

There was a high dropout rate in the population studied as 120 out of the 200 women studied (60%) were lost to follow-up during the antenatal period. They did not deliver in our centre. Therefore, we present the data set for the 80 women followed up to term who delivered in our hospital. Out of these 80, 6 (7.5%) had BV while 74 (92.5%) did not have BV.

The antenatal complications observed among these 80 participants include: malaria, epistaxis, mumps, polyhydramnios and pregnancy induced hypertension. Table 3 shows the distribution of these complications among those with and those without bacterial vaginosis. It can be seen that one out of the 6 participants with BV (16.7%) and one out of the 74 participants without BV (1.4%) had malaria in pregnancy; one out of the 6 participants with BV (16.7%) but none of the participants without BV (0%) had epistaxis; none of the participants with BV had neither mumps nor polyhydramnios whereas one participant (1.4%) without BV each had mumps and polyhydramnios. Finally, 4 of the participants without BV (5.5%) had pregnancy induced hypertension while none of the participants (0%) with BV did. However, these figures are too few to allow for any meaningful statistical analysis.

The intra- /post-partum complications recorded include: pre-term rupture of fetal membranes, preterm labour, preterm delivery, low birth weight, vacuum delivery, caesarean section, post-partum haemorrhage, birth asphyxia and macerated still births. Table 4 shows that there are seemingly higher percentage prevalence of pre-term rupture of fetal membranes, preterm labour and preterm delivery; low birth weight; vacuum delivery; and post-partum haemorrhage in those with BV compared with those without BV. Again, these figures are too few to allow for any meaningful statistical analysis. See Table 4.

## Discussion

The prevalence rate of 10.5% for BV reported in this study is lower than the rate of 17% reported for *Gardnerella vaginalis* among a pregnant population in the same Eastern region of Nigeria[4] but much higher than the prevalence rate of 1.2% for *G. vaginalis* reported among antenatal and gynaecological patients

in Ghana.[6] The figure reported in this study is however close to the rates of 9.2% and 12.4% reported among antenatal populations in Europe.[8,9]

Our study is slightly different from most of the few related local available studies[4,5,10] in Nigeria as they were strictly are on *G. vaginalis* where as ours studied Bacterial vaginosis using the four Amstel criteria. In addition most of these studies were conducted in non pregnant populations, but ours was among antenatal population. Again, the only available local study on BV conducted in Benin city [3] was among healthy premenopausal women, and used a combination of PCR and Nugent scores for the diagnosis of BV whereas ours was among antenatal patients and used the AMSTEL criteria for the diagnosis of BV.

The relatively lower prevalence of BV in our study compared to the higher prevalences of *G. vaginalis* in the other studies may be due to the more acidic nature of the vagina during pregnancy which prohibits the growth of organisms like *Gardnerella vaginalis* which are known to thrive in alkaline medium.[12]

The findings that younger women (20-34years) compared to older women (= 35years) and women of lower parities (0-4) compared to those with higher parities having higher prevalence rates of Bacterial vaginosis, is consistent with earlier report on G .V reported in an antenatal population within the same Eastern Nigeria [4].

There seems to be no available data on pregnancy outcomes in pregnant women with BV in Nigeria though there is evidence from some South African studies that Bacterial vaginosis is implicated in preterm labour [13-14]. An attempt was made during this study to follow up the patients with a view to comparing data on antenatal and intra-partum/post-partum complications among participants with and those without BV. Regrettably majority (60%) of the entire study population was lost to follow up. An earlier study [15] from the centre had shown the multiple booking patterns of patients attending the booking clinic of the hospital. [15] The antenatal complications observed in our study among the six patients with BV include epistaxis and malaria, while intra-partum/ post-partum complications observed include preterm rupture of fetal membranes, preterm delivery, low birth weight and post-partum haemorrhage. However the number of participants with BV among those followed up till delivery was insufficient to make any reasonable comparisons between both groups and thus no reasonable statistical deductions could be made.

This study documents a 10.5% prevalence of Bacterial vaginosis among asymptomatic antenatal population in a teaching hospital in Abakaliki, eastern Nigeria using the AMSTEL criteria. There also appears to be a higher association of antenatal, pre-partum, intra-partum and post-partum complications amongst women with bacterial vaginosis than those without.

We recommend a larger study to validate these findings and a properly designed experimental study to assess the effect of treatment on the adverse pregnancy outcomes of bacterial vaginosis observed.

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